Evaluation Assignment 7

Usability Test Plan

App: Drone
Team 1: 3D_rone

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Usability Test Schedule

Administrator	App	Location	Testing Date	Name	Email
M A Aziz Jahan	3D_rone App	Zoom	04/12/2022 12:00 PM	Robert (Bobby) Galbraith	rjgalbra@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	04/12/2022 1:05 PM	Lamarr Lewis	ldlewis@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	04/12/2022 2:10 PM	Tom Lottie	tlottie@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	4/14/2022 2:00 PM	Zoey Mishler	zamishle@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	4/14/2022 3:05 PM	Caleb Werdon	cawerdon@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	4/14/2022 4:10 PM	Mason Clark	mwclark@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	4/15/2022 3:00 PM	Henry dzurko	hedzurko@mtu.edu
M A Aziz Jahan	3D_rone App	Zoom	4/15/2022 4:05 PM	Connor Troub	cptroub@mtu.edu

1. Introduction

This report provides a detailed usability test plan for the application named 3D_rone developed by undergraduate student team 1. The report first describes the app briefly. Then it outlines the usability test events such as instructions, questionnaires, consent form, test scenarios and bug report. The required forms are included in the appendices.

2. System Description

Built environments must be assessed to ensure their safety. The ceiling trusses of buildings such as sports arenas must be inspected in specifically. Typically, this has been accomplished by having scissor lifts and repeatedly going up and down to cover the entire area. This is obviously inefficient and time-consuming. This work of surveying massive buildings has been simplified especially with modern drone technology.

Flying drones, on the other hand, is a challenging task. It is highly susceptible to human mistake, and crashes are common while flying in challenging or unfamiliar locations. Furthermore, because there is little or no GPS signal in inside conditions, flights must be conducted manually. Given the difficulty of flying in new interior spaces, it would be good to give some means of training and familiarizing rookie pilots with the space before flying on-site. That is, to acquaint and train people to duplicate or conduct a flight path comparable to one taken by an expert drone pilot during an inspection.

The App's aim is to give a way to visualize drone flights that are utilized in interior building inspections or other situations where autonomous GPS-driven flights aren't possible to operate. Drone pilots will be able to better understand the flight paths of expert pilots who have completed simulated checks within the space due to this visualization. The ability to communicate spatial flight route data intuitively inside a 3D space is required to provide this feature.

3. Outline of the Usability Test

The series of tasks that will be performed in the usability test are:

a. Instructions to participants
b. Signing consent form
c. Demographic questionnaire
d. Performing the experiment
e. Post-experiment questionnaire

4. Instructions to Participants

Before starting the experiment, the experimenter will explain the goals and objectives of the app in detail. Then the tasks that they have to perform will be explained in brief. The experimenter will ensure that there will be no risk using this app. Also, the experimenter will mention that the confidentiality of the participants will be maintained. Then the participants will be asked if they have any questions regarding the usability tasks.

5. Signing Consent Form

The participants will sign an informed consent form that acknowledges: the participants can cease at any time, and the privacy of their identification will be safeguarded. The experimenter will ask the participant if they have any questions. The participants can only participate in the study after signing the consent form. The consent form is included in Appendix A.

6. Usability Questions

Two sets of questions will be used in the usability test. The first one is demographic questionnaire which will be given before scenarios are tested and the second one is post-experiment questionnaire which will be given after the scenarios have been tested.

6.1 Demographic Questionnaire

After signing the consent form, the participants will be given a questionnaire which ask basic demographics questions such as participant's age, gender, previous experience about drone flight, experience in using drone apps and so on. The demographic questionnaire is included in Appendix B.

6.2 Post Experiment Questionnaire

After performing the experiment, the participant will be given another questionnaire. This questionnaire asks about the experience of the participants during the experiment. Also, it asks the participants to provide suggestions or comments about the app. The post experiment questionnaire is included in Appendix C.

7. Bug Report

Bugs are errors in the program. A bug report form is included in Appendix E. Every time a user encounters a bug, unique bug number is given and the bug's name. When a bug is first encountered, an asterisk is put by the bug. For multiple occurrences of the same bug, no description is written except the bug's name. Bug location indicates which page of the website that has the bug.

8. Test Scenarios

Three different test scenarios have been described below covering all possible cases. These test scenarios will be performed during the usability test.

8.1 Test Scenario 1 – Novice Pilot trying to Inspect the building using 3D_rone App

Test Goal

- To find how the app is analyzing the drone flight paths.
- To find the data collection of a flight path to inspect the building.
- To find how the app is responding during the analysis.

Scenario Description

You have been appointed as a Drone Pilot Inspector in a Construction Company. You have previous experience of flying drone, but this is the first time inspecting a building using drone flight mode. You have come to know about 3D_rone app from one of your friends that this app helps to analyze drone flight building paths with all possible parameters. So, you decided to test the app before going to the final show.

Task List

- (Upload View) Upload and/or select a building space (.glb) and inspection points (.txt) and provide a name for the space.
- (Upload View) Upload drone flight paths (.txt) individually, providing a name for each.
- Switch to “Analyze View” using a tab or button
- Orient scene to fit the path(s) (if needed)
- Selects to visualize, up to several, loaded drone flight paths
- Navigate the 3D environment and highlights individual paths and analyze drone flight paths, position, orientation, inspection points, trouble areas.
- Close App

Quantitative Measurement List

- Total time taken to complete the task.
- Number of times when app was giving error while uploading flight paths.
- Number of events when the app crashed while analyzing drone paths.

Qualitative Measurement List

- Whether the participant is confused and if so, why?
- How difficult it was to navigate through the page while analyzing paths.

Potential Observations of Participant

- Confusion level of the participants.
- Expression and Engagement of participants.

8.2 Test Scenario 2 – Building Manager to audit Flight paths for inspection.

Test Goal

- To find how the app is responding while analyzing the flight paths.
- To find the output of data at each inspection points of the flight path.

Scenario Description

A building manager is appointed to audit the inspection of a building of a construction company. His task will be to analyze the data points of inspection and match the data with the standard parameter. He is going to use the 3D_rone app to analyze the inspection submitted by the drone pilots through their flight paths of that corresponding building.

Task List

- (Upload View) Upload and/or select a building space (.glb) and inspection points (.txt) and provide a name for the space.
- (Upload View) Upload drone flight paths (.txt) individually, providing a name for each.
- Switch to “Analyze View” using a tab or button
- Orient scene to fit the path(s) (if needed)

- Navigate the 3D environment and highlights individual paths and analyze drone flight paths, position, orientation, inspection points.

Quantitative Measurement List

- Total time taken to complete the task.
- Number of events when the app crashed or giving error while analyzing drone paths.

Qualitative Measurement List

- Whether the participant is confused and if so, why?
- How difficult it was to navigate through the page while analyzing paths.

Potential Observations of Participant

- Was there any question in mind for the participants?
- Expression and Engagement of participants.

8.3 Test Scenario 3 – Navigate the App using the help page.

Test Goal

- To find how easy the ap is to navigate with the help of help & documentation.
- To find the user friendliness of the app.

Scenario Description

A novice user has been appointed to do a building inspection survey. He has been come to know that using 3D_rone app, he will be able to inspect a building's inspection points using drone flight paths. But he is a novice user and never used the app. He will be taking help from the help and documentation tab to navigate the app and achieve his goal.

Task List

- Open the Help & Documentation Tab.
- Navigate each tab using the help provided for corresponding tab.

- Do the analysis in analyze tab and find the data of inspection points of a building using help tab.
- Match data points of inspection corresponding to the documentation.

Quantitative Measurement List

- Total time taken to complete the task.
- Number of events when the app crashed or giving error while analyzing drone paths.
- Number of questions arises when navigating help tab.

Qualitative Measurement List

- Whether the participant is confused and if so, why?
- How difficult it was to navigate through the page while analyzing paths using help tab?
- Was participant satisfied using the app?

Potential Observations of Participant

- Was there any question in mind for the participants?
- Expression and Engagement of participants.

9. Appendix A - Consent Form

Computer User Interface Usability Testing Consent Form

You are being invited to participate in a research study to determine the usefulness and usability of computer user interfaces. This study is being conducted by Dr. Robert Pastel of Michigan Technological University Computer Science Department and students in Dr. Pastel's Human-Computer Interaction (HCI) courses. The students are performing the usability tests as part of their project and to fulfill the HCI course requirements.

There are no known risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide and tasks that you will perform will determine the usefulness and usability of user interfaces. The questionnaires and the tasks should take less than an hour to complete. The information collected may not benefit you directly, but the information learned in this study should provide more general benefits.

The questionnaires and test are anonymous. Do not write your name on the survey. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study except for the instructor of the class that is giving you credit for participating, Should the data be published, no individual information will be disclosed.

Your participation in this study is voluntary. By completing the questionnaires and performing the tasks, you are voluntarily agreeing to participate. You are free to decline to answer any particular question you do not wish to answer or not to perform a task for any reason. If you have any questions about the study, please contact Dr. Robert Pastel, Assistant Professor, Computer Science Department, Michigan Technological University, Houghton, MI 49931.

Participant signature and date:

10. Appendix B - Demographic Questionnaire

1. Age
2. Gender
3. Did you ever use any app or website to analyze drone flight paths or to inspect building using drone fight?

   (a) yes

   (b) No

   <u>Please indicate your level of agreement to the follow statements:</u>

4. I am very interested in the testing of this application.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

5. I am familiar with the Building Inspection.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

6. I am familiar with various factors of Building Inspection using drone.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

11. Appendix C - Demographic Questionnaire

Please indicate your level of agreement to the follow statements:

1. Overall, this application was easy to perform the task.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

2. I enjoyed using this application.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

3. The text was easy to read and understand.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

4. I was able to complete my tasks efficiently.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

5. I would use this application again.

   (a) Strongly agree
   (b) Agree
   (c) Neutral
   (d) Disagree
   (e) Strongly disagree

6. What did you like most about this application?

7. Do you have any suggestions for improvement of this app?

12. Appendix D – Interview Questions Regarding the basic operation of the App

Question 1: “How many drone pilots are present in the data shown to you?”
Question 2: “How many flights per pilot are shown in the visualization?
Question 3: “What general area do drone pilots start and end their flights in?”
Question 4: “What is the elevation of the highest building inspection target?”
Question 5: “Which drone pilot performed the building inspection task the fastest?”
Question 6: “Do drone pilots have a preference target exploration direction (i.e., clockwise, counterclockwise)”
Question 7: “Does the drone camera for Pilot 2 face every target at some point in the flight path?”
Question 8: “Which building inspection target was the most difficult to observe across all drone pilots?”
Question 9: “Which building inspection target was the easiest to observe across all drone pilots?”
Question 10: “Did any of the drone pilots inspect a target more than once?”

Open ended question 1: “How did you feel about the tool?”
Open ended question 2: “Could you explain your thoughts on using this tool before performing a similar drone flight within this location?
Open ended question 3: “Please run me through some of the things that you feel could be better explained in this visualization”
Opened ended questions 4: “What other information or visual representation would you use to make this tool better?”

13.Appendix E – Bug Report Form

Report any bug found related to the application in tabular format given below:

Bug Number	Bug Name	Bug Location	Bug Description